REMARKS

Claims 1-4 and 13-16 are pending. Claim 13 has been amended to better recite what the Applicant regards as his invention.

Claim Rejections - 35 U.S.C. §102

Claims 13 and 14 are rejected under 35 USC §102(b) as being clearly anticipated by Kepler et al. (U.S. Patent No. 6,037,671).

Independent claim 13 has been amended to recite "each of the alignment marks being divided by a micronized line-and-space pattern into a plurality of lines extending along a first direction, and each of the plural lines ~~constituting the line-and-space pattern~~ being divided in a second direction perpendicular to the first direction into a plurality of segments."

Claim 13 is amended to more strictly express the style of the division of the alignment mark described in Figs. 6-8 which are apparently different from the alignment mark in Fig. 3 of Kepler et al. By so amending, it is believed that claim 13 is patentably distinguished over the asserted prior art. All claims dependent thereon, including claim 14, are also patentably distinguished over the asserted prior art.

Reconsideration and withdrawal of this rejection are respectfully requested.

Claim Rejections - 35 U.S.C. §103

Claims 1-4 are rejected under 35 USC §103(a) as being unpatentable over Kepler et al. in view of Irie et al. (Patent Application Publication U.S. 2001/0019401), and further in

view of Hwang et al. (U.S. Patent 6,162,675).

The present invention according to claims 1-4 are has features relating to the micronized pattern by which the alignment mark is divided, wherein the micronized pattern has a size smaller than a resolution limit of an alignment sensor, and (ii) the micronized pattern has a pattern forming margin larger than that of a device pattern formed over the semiconductor wafer.

Regarding the first feature that the micronized pattern has a size smaller than a resolution limit of an alignment sensor, the Office accepts the argument that Kepler et al. does not disclose the micronized pattern having a size smaller than a resolution limit of an alignment sensor. However, the Officer concludes that this feature is rendered obvious over Kepler et al. in view of Irie et al.

As the Office action points out, Irie et al. discloses a density filter of light having a light attenuating portion on which the light blocking material is deposited in dots while changing the probability of presence, wherein the size of dots becomes less than the resolution limit of an optical system having a plurality of optical elements arranged between the density filter and master reticle.

However, there must be a set of misunderstandings in the Office argument as described in detail below.

In the present invention, according the claims 1-4, it is the micronized pattern dividing the alignment mark that has a size smaller than the resolution limit of an alignment sensor. On the other hand, Irie et al. discloses the density filter having the light attenuating portion comprised of the dots whose size becomes less than the resolution limit of the optical system.

Even though the way to divide the light attenuating portion of the density filter was disclosed in Irie et al., one of ordinary skill in the art could not apply the way to divide the light

attenuating portion of the density filter to the way to divide the alignment mark, since there are functional and structural differences between the alignment mark and the light attenuating portion of the density filter. For example, the dots of the light attenuating portion must be formed to increase in probability of presence from the inside (the light transmitting portion side) to the outside (the light blocking portion side) of the density filter so that the light attenuating rate becomes higher by a straight line or in a curve the further from inside to the outside. Such a situation has absolutely nothing to do with the alignment mark.

In the present invention according to claims 1-4, the alignment mark is divided by the micronized pattern having a size smaller than a resolution limit of an alignment sensor so as to make FIA (Field Image Alignment) signals to have higher contrast and little deformations. Irie et al. neither discloses nor suggests a relationship between FIA signal and a pattern size smaller than a resolution limit of an optical system.

In addition, the Office seems to correlate the division by a pattern having a size smaller than a resolution limit of an optical system directly with higher light attenuation rate. However, as can be grasped in Irie et al., the probability of presence of the dots, whose size becomes less than the resolution limit of the optical system, is adjusted so that the light attenuating rate becomes higher by a straight line or in a curve further from the inside to the outside. In other words, the lower the probability of presence of the dots becomes, the lower the light attenuation rate becomes. Whether the light attenuation rate is high or low is not determined only by the size of the dots without the probability of presence of the dots. In this regard, it does not make sense for the Office to argue and conclude that it would have been obvious to one of ordinary skill in the art at the time of the

invention to introduce the micronized pattern of Kepler et al., such that it would have a smaller size than a resolution limit of an alignment sensor in order to increase the light attenuation rate.

As described above, the first feature of the present invention according to claims 1-4 that the micronized pattern has a size smaller than a resolution limit of an alignment sensor is not obvious over Kepler et al. in view of Irie et al.

Regarding the second feature of the present invention according to claims 1-4 in that the micronized pattern forming margin larger than that of a device pattern formed over the semiconductor wafer, the Office points out that Hwang et al. discloses a DRAM cell with a device pattern margin.

However, Hwang et al. discloses neither pattern forming margin of micronized pattern dividing alignment mark larger than that of device pattern, nor a relationship between pattern forming margins of micronized pattern and device pattern. Though a change in size is generally recognized as being within the level of ordinary skill in the art, one of ordinary skill could make adjustment in alignment mark patterns at most and could not reach the second feature of the present invention according to claims 1-4 based on Hwang et al. even when combined with Kepler et al.

As discussed in detail above, the present invention according to claims 1-4 is not unpatentable over Kepler et al. in view of Irie et al., and further in view of Hwang et al.

Claims 15 and 16 are dependent from anyone of claims 13 and 14, and Kepler et al. completely differs from the present invention according to amended claim 13 and claim 14 dependent from claim 13 as mentioned above. Therefore, it is clear that the present invention

according to claims 15 and 16 would have been unobvious to one of ordinary skill in the art at the time the invention was made, even if Kepler et al. and Hwang et al. are combined.

Reconsideration and withdrawal of this rejection are respectfully requested.

CONCLUSION

In view of the aforementioned amendments and accompanying remarks, all pending claims are believed to be in condition for allowance, which action, at an early date, is requested.

In the event that this paper is not timely filed, Applicants respectfully petition for an appropriate extension of time. Please charge any fees for such an extension of time and any other fees which may be due with respect to this paper, to Deposit Account No. 50-2866.

Respectfully Submitted,

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